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The Australian Annuity Market

David M. Knox

The private market for life annuities (with longevity insurance) is not well developed in Australia. It is crowded out partly by the public provision of means-tested old-age pensions and partly by retirees' preference for lump sum payments and, when constrained by law, for allocated annuities that do not provide longevity insurance.

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Summary findings

In Australia, a means-tested old-age public pension is paid from general tax revenues. A full pension (equivalent to roughly a quarter of the average wage) is currently paid to more than half the aged population, and a reduced pension is paid to another quarter of the aged population. About 20 percent receive no old-age public pension because of the level of their income or assets.

There is also a compulsory system under which employers contribute at least 7 percent of salaries into a superannuation plan for the vast majority of employees. (This minimum rate will gradually rise to 9 percent in 2002.) More than 80 percent of superannuation benefits are received as lump sums; when public sector employees are excluded, the figure rises to almost 90 percent.

The market for private life annuities with longevity insurance is very small. Greater use is made of allocated annuities, which are similar to income drawdowns in the United Kingdom or scheduled withdrawals in Latin American countries.

The value of life annuities, measured by the money's worth ratio, compares favorably with that of annuities available in the United Kingdom and United States. But these ratios are calculated on the basis of conservative government bond yields. Many investors prefer allocated annuities—which are perceived to offer considerable advantages in flexibility and higher potential returns—despite the absence of longevity insurance.

This paper—a product of Finance, Development Research Group—is part of a larger effort in the group to study the development of annuity markets. Copies of the paper are available free from the World Bank, 1818 H Street NW, Washington, DC 20433. Please contact Agnes Yaptenco, room MC3-446, telephone 202-473-1823, fax 202-522-1155, email address ayaptenco@worldbank.org. Policy Research Working Papers are also posted on the Web at www.worldbank.org/research/workingpapers. November 2000. (26 pages)

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1 Introduction

The primary objective of any retirement income system should be the provision of an adequate and sustainable level of income to retirees. However, such a simple objective raises a number of important social, philosophical and economic questions. For instance, who should bear the risks of longevity and inflation? During the retirement years, how much flexibility should be provided to individual retirees in managing their own financial affairs? This latter question also raises the issues of how individuals draw down their asset balances during retirement and whether the Government should place any controls on these withdrawals.

At one extreme, the Government could provide annuity products for all retirees and thereby provide insurance against the risks that exist. On the other hand, individuals could be permitted to receive the benefits accumulated during their working years in a lump sum form with no incentives or requirements to convert these assets into annuities. Of course, there is a range of alternatives that exist between these extremes.

The actual policies adopted will depend on the social, political and economic positions of the country, as well as the relationship between the public pension system and the retirement savings that exist in the private sector. Taxation policies will also be important.

The Australian position is very unusual when compared to other developed countries. In terms of public provision, there exists a means-tested age pension, paid from general taxation revenue. A full pension (equivalent to about one quarter of the average wage) is currently paid to more than half the aged population and a reduced pension is paid to another one quarter of the aged population. About twenty per cent receive no age pension due to the level of their income or assets.

In terms of the financial provision for retirement in the private sector there is, in effect, a compulsory system for the vast majority of employees requiring employers to contribute at least 7 per cent of salaries into a superannuation plan.[1] (This minimum rate is rising gradually to reach 9 per cent in 2002.) However, there are no requirements as to the form of these superannuation benefits when they are received at retirement. That is, they can be taken in lump sum or as a pension.

More than 80 per cent of superannuation benefits are received as lump sums and when public sector employees are excluded, the figure rises to almost 90 per cent. Hence, most Australian retirees have a personal choice as to how to spend or invest their retirement benefits. The presence of a means test on the publicly funded age pension influences many of these decisions.

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[1] The term 'superannuation' is used in Australia to include pre-retirement saving through a regulated superannuation fund that may be employer sponsored, industry based or a personal fund. As benefits are mostly paid in lump sum form the term 'occupational pensions' is not in use.

This context of significant personal choice is important when considering the Australian annuity market. As will be noted in this paper, there exists a wide range of annuity products, including some that are encouraged by the Government. However, it is life annuities that can provide the best protection from the longevity risk faced by retirees.

In a voluntary annuity market, as exists in Australia, it is also recognised that a group of voluntary annuitants will live longer, on average, than the population as a whole. Hence, the providers of these annuities must allow for the effect of this adverse selection. In this paper, the level of these selection effects will be calculated and compared with similar products from the US and the UK. We will also explore the expected present values for different types of life annuity products. The effects of the current taxation and Social Security arrangements will also be reviewed.

Section 2 of the paper provides statistical information on the Australian annuity market and Section 3 discusses some of the operating features of the Australian life annuity market. Section 4 explains some of the assumptions needed for calculating the expected present values of life annuities before Section 5 presents the results and the Money's Worth Ratios for a range of situations. The influence of taxation and the means tests will be discussed in Section 6. Finally Section 7 sums up the paper.

2 The Australian annuity market

The size of the Australian annuity market is shown in Table 1. The table shows the funds under management in respect of three types of post-retirement income products. For comparison purposes, the table also shows the total assets under management in the Australian superannuation system and the total assets under management by Australian life insurance companies.

Table 1. The size of the Australian annuity market

Date *Income Product*	Dec 1994 $ bill	Dec 1995 $ bill	Dec 1996 $ bill	Dec 1997 $ bill	Dec 1998 $ bill
Allocated annuities and pensions	5.776	6.540	8.139	11.730	15.259
Term certain (or period certain) annuities	3.215	4.225	4.858	5.942	6.429
Life annuities	1.354	1.515	1.967	2.374	2.989
Total funds backing annuity products	10.345	12.280	14.964	20.046	24.677
Total super-annuation assets	206.440	240.143	271.270	325.722	377.367
Assets backing annuities as a % of super'n assets	5.01%	5.11%	5.52%	6.15%	6.54%
Life insurance companies	$ bill	$ bill	$ bill	$ bill	$ bill
Total assets in life companies	100.261	107.776	116.589	151.821[1]	160.026
Non super-annuation assets[2]	30.027	29.231	27.961	33.401	29.559

1 A new series of statistics commenced here.

2 This row of figures highlight the fact that the level of non-superannuation assets in Australian life insurance companies have remained stable during the last five years, whilst the growth of superannuation assets has increased significantly.

Sources: Rice Kachor (1999); APRA (1999a)

Table 1 shows that there are three types of retirement income products available in the Australian market. These are allocated annuities and pensions (which are the most popular), term certain annuities and life annuities. These latter two types of annuities are similar to those sold in other retail annuity markets and need no further explanation. Life annuities will be discussed further in Section 3 when a range of issues are considered and in Section 5 when Money's Worth Ratios are presented. However allocated annuities (or pensions), which have grown in relative importance in recent years, require further comment.

An allocated annuity is an investment product where the retiree invests a lump sum benefit arising from his/her superannuation fund. The investor selects a particular investment strategy which can range from a capital guaranteed product to a market-linked fund, where the value of the investment moves in line with the underlying

investments. However, income payments must be made to the investor, at least once a year. In addition, the size of these payments must be within limits prescribed by the Government. These limits are set such that the maximum payment per year ensures that the fund does not run out before age 80 and that the minimum payment is the account balance divided by the life expectancy at that age.

As an example, let us assume that the account balance at the start of the financial year for a retiree aged 65 is $150,000. During the following year, the total income payments must be between the minimum of $9,550 (i.e. 150,000/15.7) and the maximum of $18,520 (i.e. 150,000/8.1). Some years later the fund has become $125,000 (due to investment earnings minus annuity payments) and the beneficiary is now aged 75. In this year, the minimum payment is $11,060 (i.e. 125,000/11.3) and the maximum payment is $29,070 (i.e. 125,000/4.3). Attachment A shows the minimum and maximum factors for each age.

As shown in Table 1, the allocated income products are very popular and currently represent more than 60% of the market for retirement income products. It should be stressed that they are an investment product and offer no protection against longevity risk. However, as indicated in the previous example, they offer retirees considerable flexibility in managing their post retirement income.

These allocated products can be offered by a life insurance company (where they are known as allocated annuities) or a superannuation fund (where they are known as allocated pensions). These superannuation funds include corporate funds and 'public offer' funds, which are operated by financial institutions and offer allocated pensions to the public as a retail product. The figures shown in the first half of Table 1 include market information on all retail post-retirement income products. It is estimated that life insurance companies have about 70 per cent of the market in allocated products.

Another important feature of the Australian market is that life annuities are relatively unpopular. This was highlighted in Table 1 and is again illustrated in Table 2, which shows the assets of life insurance companies as at December 1998 for each type of life insurance product. Table 2 also shows the single premium income for the six months to June 1998 and the annual premium in force as at June 1998 for each type of life insurance product.

Table 2. Data on the Australian life insurance industry

Product	**Assets as at Dec 98** $ bill	**Premiums** Single Premium $ bill	In-force Annual Premium $ bill
Investment linked:			
- individual	48.649	4.412	1.834
- group	31.088	2.640	0.791
Investment account:			
- individual	15.818	0.724	0.766
- group	9.836	0.917	0.396
Allocated annuities:			
- individual	10.184	1.368	n.a.
- group	0.676	0.071	n.a.
Term certain annuities	5.266	0.700	n.a.
Life annuities	3.685	0.056	n.a.
Group annuities	0.015	0.000	n.a.
Conventional, risk and other products	36.101	0.119	2.720
Total	**161.318**	**11.007** for Jan-June 1998	**6.507 pa** at June 1998

Source: APRA (1999b), unpublished

Table 2 highlights a number of important features of the Australian life insurance market. These include:

- the dominance of investment products, most of which relate to superannuation, whether it be group or individual business;
- the dominance of allocated annuities in the annuity market;
- the unpopularity of life annuities, comprising less than 3 per cent of the premiums received for annuities in the latest six month period;
- the absence of group annuities in the Australian market;
- the fact that conventional and risk based life insurance products represent a relatively small percentage of the total business.

These features of the Australian market mean that this report cannot consider group annuity business in Australia, as it does not exist. Furthermore, as will be discussed in Section 3.4, the lack of a developed life annuity market means that no annuitants mortality table has been developed in Australia.

3 The operations of the life annuity market

3.1 Market prices

Although the Australian life annuity market is poorly developed, there are ten life offices that provide regular quotations, including the largest six life insurance companies.

Tables 3-7 provides the level of the initial annuity provided for a range of annuity contracts for a $100,000 purchase price as at December 1998, as shown in Rice-Kachor (1999). For each annuity product, the tables show the mean price, the minimum and maximum prices quoted and the price offered by AMP, which is the market leader in the life annuity market and the largest life insurance company in Australia.

3.2 Assumptions used in pricing life annuities

The major assumptions that are required in pricing life annuities relate to the future investment earning rates, future mortality rates and expenses.

In respect of the assumed investment earning rates, one approach used is to assume the Government bond rate for the early years and then to gradually increase the assumed rate, allowing for an increasing exposure to the equity market.

In terms of mortality assumptions, a percentage of the IM80/IF80 tables[2], with an allowance for mortality improvements, are commonly used. Differentiation is made according to age and gender.

Commission can be paid to the intermediary (for example, the agent or broker) and may be as high as 4 per cent of the purchase price. This figure is subject to market pressure and is not determined by regulation. However, any commission paid must be revealed to the purchaser and reduces the net purchase price. The level of commission paid can be reduced and may even be zero, if a fee for service is charged by the intermediary.

Reinsurance is normally not used.

[2] There is no Australian annuitants mortality table and this table, based on UK experience, was reported in Institute of Actuaries and Faculty of Actuaries (1990).

Table 3. Initial annuity payment for $100,000 purchase price for a male aged 60

Product *Prices Quoted*	Level annuity	Level annuity With 10 year certain	Indexed annuity at CPI[2]	Indexed annuity at CPI with 10 year certain	Indexed annuity at 5% pa	Indexed annuity at 5% pa with 10 year certain
Average price [1]	7383	7110	5731	5535	4159	4014
AMP price	7545	7311	6158	5980	4209	4108
'Worst' price	6770	6519	4971	4781	3431	3383
'Best' price	8051	7498	6158	5980	4859	4533

Notes 1 The average prices shown include all prices quoted. In most cases, excluding the best and worst prices makes very little difference.

2 There are only 7 offices quoting CPI indexed annuities and 9 offices quoting 5% indexed annuities.

Table 4: Initial annuity payment for $100,000 purchase price for a male aged 65

Product *Prices Quoted*	Level annuity	Level annuity with 10 year certain	Indexed annuity at CPI	Indexed annuity at CPI with 10 year certain	Indexed annuity at 5% pa	Indexed annuity at 5% pa with 10 year certain
Average price	8405	7899	6750	6366	5174	4883
AMP price	8641	8153	7225	6836	5393	5135
'Worst' price	7516	7265	6092	5676	4162	4052
'Best' price	9171	8298	7225	6836	5963	5412

Table 5: Initial annuity payment for $100,000 purchase price for a female aged 60

Product *Prices Quoted*	Level annuity	Level annuity with 10 year certain	Indexed annuity at CPI	Indexed annuity at CPI with 10 year certain	Indexed annuity at 5% pa	Indexed annuity at 5% pa with 10 year certain
Average price	6666	6512	5029	4926	3475	3400
AMP price	6862	6761	5517	5442	3523	3486
'Worst' price	6086	5722	4008	3946	2863	2850
'Best' price	7420	7002	5517	5442	4255	4061

Table 6: Initial annuity payment for $100,000 purchase price for a female aged 65

Product *Prices Quoted*	Level annuity	Level annuity with 10 year certain	Indexed annuity at CPI	Indexed annuity at CPI with 10 year certain	Indexed annuity at 5% pa	Indexed annuity at 5% pa with 10 year certain
Average price	7446	7183	5811	5627	4266	4123
AMP price	7750	7524	6381	6206	4509	4403
'Worst' price	6680	6461	4857	4708	3405	3364
'Best' price	8306	7700	6381	6206	5147	4780

Table 7: Initial annuity payment for $100,000 purchase price a last survivor annuity for a male aged 65 and a female aged 60

Product *Prices Quoted*	Level annuity	Level annuity with 10 year certain	Indexed annuity at CPI	Indexed annuity at CPI with 10 year certain	Indexed annuity at 5% pa	Indexed annuity at 5% pa with 10 year certain
Average price	6521	6384	4950	4853	3432	3349
AMP price	6740	6670	5414	5362	3473	3447
'Worst' price	5106	5091	3094	3087	2414	2410
'Best' price	8089	7800	6413	6203	4927	4782

3.3 Solvency and Capital Adequacy rules

The Solvency Standard set out by the Life Insurance Actuarial Standards Board requires that the statutory fund of a life company have available capital in excess of the Best Estimate Liability to provide for the security of the policy owners' entitlements under a range of adverse conditions. It should be noted that the Best Estimate Liability, as the name implies, is neither a deliberate under- nor over-estimate of the policy liability.

The Solvency Requirement broadly comprises the following components:

The Solvency Liability is a calculation of the liabilities under the policies on a more conservative basis that the best estimate assumptions;

\+ *Other liabilities* owed to creditors;

\+ *The Expense Reserve* provides for the overrun of acquisition expenses which can occur upon closing a statutory fund to new business;

\+ *The Resilience Reserve* represents the mismatching of asset and liability reserves and allows for adverse movements in the investment markets; and

\+ *The Inadmissible Assets Reserve* required for assets which are dependent on the ongoing conduct of the business, holdings in associated financial entities and concentrated asset exposures.

In terms of the solvency liability for life annuities, some of the prescribed assumptions are as follows:

- The *gross investment earnings* must be the gross redemption yield of the 10 year Government securities;
- The *base mortality rates* for annuitants should be 50% of IM80/IF80 Ultimate for policy duration 0 and 60% of this table for durations beyond 0;
- Allowance for annuitant *mortality improvements* after 1996 is to be made as follows:

$$q_{x,t} = q_{x,0} * RF(x,t)$$

$$\text{where } RF(x,t) = 0.975^t \qquad \text{for } x \leq 60$$

$$= (0.975 + 0.0005 * (x - 60))^t \qquad \text{for } x > 60$$

- Servicing *expenses* must include a margin of 2.5% above the greater of the actual or expected servicing costs;
- *Inflation* must be the gross redemption yield in 10 year Government securities less 4%.

In addition to the Solvency Standards, there is a Capital Adequacy Standard which is designed to ensure that the obligations and reasonable expectations of both policy owners and creditors can be met, under a range of adverse circumstances, in the context of a viable ongoing operation.

The Capital Adequacy Standard adopts a less prescriptive approach than the Solvency Standard in recognition of the differing business strategies of companies. Reliance is

placed on the professionalism of the Actuary for appropriate assessment. The Capital Adequacy Requirement must be at least as great as the Solvency Requirement.

The Capital Adequacy Requirement broadly comprises the following components:

The Capital Adequacy Liability is a calculation of the liabilities under the policies on a more conservative basis that the best estimate assumptions;

+ *Other liabilities* owed to creditors;
+ *The New Business Reserve* provides for planned new business over the next three years;
+ *The Resilience Reserve* represents the mismatching of asset and liability reserves and allows for adverse movements in the investment markets; and
+ *The Inadmissible Assets Reserve* required for holdings in associated financial entities and concentrated asset exposures.

The assumptions used are less prescriptive than under the Solvency Requirement and are left to the discretion of the Actuary. For instance:

- *The investment earnings assumption* will have a margin of between 40 and 300 basis points from the best estimate assumption;
- *The base annuity table* will have a margin of between 2.5% and 10% from the best estimate assumption; and
- *Improvements to annuitant mortality* are between 2% p.a. and 5% p.a. for those under age 75 and between 1% p.a. and 2.5% p.a. for those aged 75 and over.

3.4 Annuitants mortality table

As mentioned above, the life annuity market in Australia is not well developed and an annuitants mortality table has not been produced.

The most recent Report from the Mortality Committee of the Institute of Actuaries of Australia (1999) in respect of the experience in 1995-97 made the following comments in respect of their investigation into annuities:

- The data is limited as it is in respect of 2 offices in 1995, 4 offices in 1996 and 4 offices in 1997 with a total of 5 different offices involved;
- The total exposed-to-risk was 24,761.5 years (11,149.5 males and 13,612 for females) with 571 deaths (297 males and 274 females);
- The experience is heavily concentrated in the 60-80 age group with this group representing more than 85% of total exposure;
- The benchmark mortality table used was IM80/IF80 Base (ultimate).

Table 8 shows the ratio of Actual to Expected deaths, for 10 year age groups, different durations, and both genders. Estimated Standard Errors (%) are shown in parentheses.

Table 8. The Australian experience of annuitants mortality compared to IM80/IF80

	Ratio of Actual to Expected (%)	
Age group	**Males**	**Females**
60-69	60 (7)	42 (8)
70-79	51 (5)	53 (6)
80-89	68 (8)	83 (8)
90-99	95 (21)	124 (17)
Duration		
0	72	60
1 and over	58 (4)	69 (4)
2 and over	58 (4)	68 (4)
5 and over	59 (4)	69 (5)
All	59 (3)	68 (4)

The Committee's conclusion suggests that the overall results for the whole portfolio "do not seem overly inconsistent with the solvency assumption", which was mentioned in Section 3.3. Further, the variation by age "raises the issue of the shape of the IM80/IF80 table and whether, perhaps, a steeper mortality curve might be more appropriate, particularly for females."

In view of the small volume of data, and the fact that it was contributed by a small number of companies, an annuitants mortality table for Australia has not been produced. Reliance on the IM80/IF80 tables from the United Kingdom continues.

4 The value of a life annuity – the assumptions needed

The previous sections have reviewed the Australian life annuity market but have not considered it from the perspective of the individual purchaser. Some recent research (see Mitchell et al (1997), Poterba and Warshawsky (1999)) have attempted to assess the value of a life annuity to the purchaser by adopting the "Money's Worth Ratio" approach. In essence, this approach expresses the expected present value of the annuity payments as a percentage of the purchase price.

For example, Poterba and Warshawsky (1999) have shown that for a 65 year old male annuity buyer in the US, the expected present discounted value of the payments from the average policy in June 1998 was approximately 85 per cent of the purchase price. This calculation assumed that the individual was subject to average population mortality and that the payments were discounted at a riskless rate of return.

Obviously, when assessing the value of these annuity payments, the assumed mortality rates and interest rates for the future are critical.

Section 5 will explore the worth of an annuity to purchasers in the Australian market, based on the average price for a range of annuity products, using a variety of mortality tables and interest rates. However, before considering these values, it is necessary to review the assumptions that could be used for mortality and interest rates.

4.1 Mortality assumptions

As previously discussed, there is no Australian annuitants mortality table. It is therefore necessary to begin with population mortality rates.

The latest available Australian Life Table based on the quinquennial census is the Australian Life Tables 1990-92 prepared by the Office of the Australian Government Actuary (1995). In this paper these tables will be shown as *ALT90-92*. The next Australian Life Tables centred on the 1996 census are expected to be available later in 1999.

However, more recent population life tables, based on deaths in 1995-97, have been prepared jointly by the Australian Bureau of Statistics and the Office of the Australian Government Actuary and published in ABS (1998a). In this paper, these tables will be shown as *A95-97*.

Of course, one of the key assumptions in assessing the expected present value of future annuity payments is to allow for future improvements in mortality rates. The life tables mentioned above make no allowance for future improvements.

However, in projecting the future population of Australia from 1997 in ABS (1998b), it was necessary for the Australian Bureau of Statistics to make some allowance for future mortality improvements. They analysed the past trends in mortality rates for the five underlying causes of death from 1967 to 1996 to determine the assumptions to be used for the longer term annual rates of change. In addition, they considered the experience over the last ten years to determine the assumed changes in the shorter term (or until 2005-06). Table 9 shows the annual rates of change assumed for each quinquennial age group over age 60 in their population projections for both the shorter and longer terms.

Table 9. Projected annual rates of change in mortality rates from 1997

	Shorter term (up to 10 years)		**Longer term** (after 10 years)	
Age group	**Male %**	**Female %**	**Male %**	**Female %**
60-64	-2.6626	-2.0114	-1.1008	-0.8398
65-69	-2.0578	-1.5548	-0.9467	-0.5294
70-74	-2.0265	-1.8639	-0.8306	-0.4961
75-79	-1.7804	-1.1535	-0.9029	-0.8020
80-84	-1.1390	-1.0289	-0.5900	-0.8401
85-89	-0.2767	-0.3977	-0.4745	-0.7804
90-94	-0.5389	-0.4620	-0.2852	-0.6293
95-99	-0.2850	-0.3143	-0.2289	-0.4042

Source: ABS (1998b), Population Projections 1997 to 2051

These projected mortality improvements are in respect of the total population. As they are projected to commence in 1997, it is appropriate to apply them to the 1995-97 population life tables to produce a population table that allows for mortality improvement. In this paper, these projected life tables will be shown as *A95-97 (imp)*.

The final mortality table that will be used in these calculations is a percentage of the IM80/IF80 tables. The percentage used will be 60%. This figure has two advantages. First, it is consistent with the recent Australian experience of annuitants mortality as shown in Table 8 (especially for males) and second, it is the rate quoted in the Solvency Standard. In this paper, this table will be shown as *0.6*IM/IF80*.

To highlight the differences between these assumed mortality tables, Table 10 shows the probability of death at ages 70 and 80, for both males and females, under each of the tables mentioned.

Table 10. Probability of death at different ages

Table	*ALT90-92*	*A95-97*	*A95-97 (imp) in 10 years*	*0.6*IM/IF80*
Male, aged 70	0.03290	0.02948	0.02402	0.02105
Female, aged 70	0.01672	0.01556	0.01289	0.01172
Male, aged 80	0.08504	0.07794	0.06950	0.04882
Female, aged 80	0.05093	0.04839	0.04364	0.03352

4.2 Interest rate assumptions

The interest rate used to discount the future annuity payments is critical in determining its value to the purchaser. As the following calculations are based on the annuity prices quoted as at 31 December 1998, the interest rates used should be at the same date. Three approaches will be shown.

1. The market yield on 10 year Government bonds at 31 December 1998 was 5.07%, payable half yearly. This is equivalent to an effective annual rate of 5.13%. This could be assumed to be the long term riskless rate and will be shown as the *flat* rate in the following tables.

2. An alternative approach is to use the yield curve in Government bonds at December 1998 and calculate a series of spot rates for each year. This is equivalent to a zero coupon bond maturing at the end of each year. These rates increased from 4.67% for the one year spot rate to 5.19% for the 12 year spot rate, which is the longest term available. This latter spot rate has also been used for all years after year 12. This series will be shown as the *spot* rates in the following tables.

3. However, it is likely that the annuity providers will invest in a range of investments, including but not restricted to Government bonds. These other investments, including corporate fixed interest, should earn a higher yield than Government paper. However the Australian corporate bond market is not fully developed such that a corporate yield curve cannot be used. To provide some indication of the effect of a higher yield, two approaches will be used. The first is to use a higher long term rate of 5.63% (shown as *flat + 0.5%* in the tables) and the second is to increase the spot rates by a full 1% (shown as *spot + 1%*). In practice, the yield on a high quality corporate bond is likely to be in the vicinity of 100 basis points higher than the Government bond rate.

5 The Values of Life Annuities - the Money's Worth Ratios

This section presents the "Money's Worth Ratio" (MWR) for a range of annuity products. These are equivalent to the expected present discounted value of the annuity payments divided by the purchase price, and then expressed as a percentage. Tables 11-15 show the Ratios for a range of situations. The annuity payments used are the average payments listed in Tables 3-7.

Before considering these results in detail, it is worth noting that the majority of the Money Worth Ratios for level annuities are in the range of 85-95 per cent of the purchase price, with the lower figures arising when population mortality tables without improvement are used.

International comparisons are also interesting. For example, the Ratio in respect of a level annuity for a 65 year old male, based on population mortality and the term structure

of Government interest rates, is 87.5% (Table 12) compared to 86.1% in the United Kingdom (see Finkelstein and Poterba (1999)) and 85.0% in the USA (see Poterba and Warshawsky (1999)). This suggests that the Australian market, although undeveloped, is consistent with major international markets. Indeed, if anything, it is slightly more generous to the purchasers.

However, there are a number of important trends in the results. These include the following:

- As expected, different mortality tables have a significant effect. In all cases, these Ratios increase with more recent mortality tables and are highest when the mortality rates are assumed to be 60% of the UK annuitants table. For instance, the 65-year-old male figure increases from 87.5% on the latest population mortality table to 98.6% on the best estimate annuitants table. That is, the expected present value is 12.7% per cent higher due to the effect of adverse selection. The corresponding increase for 65-year-old females is 8.4%.
- Using the mortality improvements assumed in *Population Projections,* the Ratios for level annuities increase by about 3-4 percentage points for males and 1.7-2 percentage points for females. The higher increase for males is consistent with the assumption that male mortality rates will improve at a faster rate than for females.
- The assumed mortality improvements have a much greater effect on the Ratios for indexed annuities with the male Ratios increasing by about 6 percentage points and the female Ratios by about 3.5 percentage points. This result is not surprising as the effect of the improved mortality is greatest in the later years when the effect of indexation is greatest.
- The use of a series of zero coupon interest rates instead of a flat rate increases the Ratios by about 1.5 percentage points. The higher Ratios are due to the fact that the assumed riskless rates in the early years is lower than the 10 year bond rate, thereby giving a higher present value.
- The effect of increasing the flat rate of interest by 0.5 per cent (to allow for higher investment yields) reduces the Ratios for level annuities by 3.4-4.7 percentage points with a slightly higher reduction occurring for purchasers at younger ages and for females, where the expected life of the annuity is longer. In terms of indexed annuities, the result is even greater with the reduction ranging from 4.3 percentage points for males aged 65 to 6.1 percentage points for the last survivor products.
- Similar trends are seen when the forward rates are increased by 1 per cent per annum to allow for the higher rates that could be available say, from the corporate bond market. In this case the Ratios for 65 year males decrease by 6.85 percentage points for a level annuity.
- There exist some minor differences between the results between male and females, with the Ratios for female purchasers tending to be a little higher than for male purchasers, particularly when the population tables are used. However, the reverse occurs, when the annuitants table is used.
- The Ratios have been calculated for three different types of annuities. In general, there are very small differences between the two level annuities with the differences often less than one percentage point. However, the indexed annuities provide a much

lower Ratio than for level annuities (in most cases, between five and seven percentage points) when a population mortality table is used, with or without an allowance for improvement. However, when the annuitants mortality table is used, the Ratios for indexed securities improve substantially exceeding 93 per cent in every case and even exceeding 100 per cent in some cases. This result is in contrast to the UK results where the Ratios for indexed annuities are less than those for level annuities.

So what do we conclude? Are life annuities good value in the Australian market?

It is apparent that the assumption in respect of future mortality rates is very critical in assessing the value of a life annuity to a purchaser. The latest Australian annuitant mortality data (admittedly based on a small sample) suggests that the current mortality rates of Australian annuitants are in the order of 60% of IM80/IF80 tables. For level annuities, using this mortality assumption and the 10 year bond rate, most of the Money's Worth Ratios for single lives are in vicinity of 95 per cent of the purchase price.

Initially, this suggests that the existing pricing structure is very fair and reasonable for the purchasers as one must expect the Ratios to be less than 100 per cent, as the provider must allow for expenses, taxes, the acceptance of risks, the need for capital and the desire to make a profit.

However, these results do not represent the complete picture. In assessing the value of these products, it must be recalled that the providers should make some allowance for improvements in mortality which will increase the Ratio. On the other hand, it is also expected that they would earn a rate of return in excess of the bond rate which will decrease the Ratio.

What is a reasonable balance between these two opposing forces?

As noted above, allowing for future mortality improvements in the Australian Population Projections, increases the Ratios by 2-4 percentage points for level annuities. On the other hand, an increase in the investment yield by 50 basis points decreases the Ratios by about 4 percentage points. This assumed increase in the yield above the bond rate is conservative and it would be reasonable to assume that an annuity fund should earn at least 1% per annum higher than the long term bond rate. If this were the case, the net result, of allowing for some mortality improvements and a yield one per cent higher than the bond rate, is likely to be a reduction in the Money's Worth Ratios of 4-6 percentage points, when using the IM80/IF80 mortality tables. This would mean that the effective Ratio for most purchasers of level annuities would be in the vicinity of 90 per cent of the purchase price.

Table 11: Money Worth Ratios for a range of male annuity products and mortality tables using a flat rate of interest

Age of purchase	**60**					**65**				
Mortality table	ALT90-92	A95-97	A95-97 imp	0.6*IM80	A95-97 imp	ALT90-92	A95-97	A95-97 imp	0.6*IM80	A95-97 imp
Interest rate (flat)	5.13%	5.13%	5.13%	5.13%	5.63%	5.13%	5.13%	5.13%	5.13%	5.63%
Type of annuity	%	%	%	%	%	%	%	%	%	%
Level	84.23	86.79	90.78	94.82	86.80	83.34	86.08	89.84	96.93	86.41
Level with 10 year certain	85.25	87.14	90.65	94.10	86.72	85.54	87.33	90.37	95.91	86.96
Indexed at 5% pa	78.04	81.48	88.03	96.00	82.89	78.53	82.04	87.75	99.86	83.44

Table 12: Money Worth Ratios for a range of male annuity products and mortality tables using spot rates of interest

Age of purchase	**60**					**65**				
Mortality table	ALT90-92	A95-97	A95-97 Imp	0.6*IM80	A95-97 imp	ALT90-92	A95-97	A95-97 imp	0.6*IM80	A95-97 imp
Interest rate (flat)	spot	spot	Spot	spot	spot+1%	spot	spot	spot	spot	spot+1%
Type of annuity	%	%	%	%	%	%	%	%	%	%
Level	85.65	88.27	92.32	96.43	84.50	84.72	87.51	91.35	98.56	84.57
Level with 10 year certain	86.70	88.63	92.20	95.71	84.47	86.98	88.81	91.91	97.54	85.17
Indexed at 5% pa	79.42	82.92	89.58	97.67	79.57	79.91	83.49	89.31	101.62	80.85

Table 13: Money Worth Ratios for a range of female annuity products and mortality tables using a flat rate of interest

Age of purchase	**60**					**65**				
Mortality table	ALT90-92	A95-97	A95-97 imp	0.6*IF80	A95-97 imp	ALT90-92	A95-97	A95-97 Imp	0.6*IF80	A95-97 imp
Interest rate (flat)	5.13%	5.13%	5.13%	5.13%	5.63%	5.13%	5.13%	5.13%	5.13%	5.63%
Type of annuity	%	%	%	%	%	%	%	%	%	%
Level	86.63	88.11	90.00	93.91	85.70	86.16	87.95	89.86	95.37	86.07
Level with 10 year certain	86.63	87.87	89.65	93.04	85.39	86.69	88.04	89.77	94.41	86.01
Indexed at 5% pa	79.84	81.93	85.55	93.04	80.01	80.77	83.10	86.42	96.20	81.64

Table 14: Money Worth Ratios for a range of female annuity products and mortality tables using spot rates of interest

Age of purchase	**60**					**65**				
Mortality table	ALT90-92	A95-97	A95-97 imp	0.6*IF80	A95-97 imp spot+1%	ALT90-92	A95-97	A95-97 imp	0.6*IF80	A95-97 imp spot+1%
Type of annuity	%	%	%	%	%	%	%	%	%	%
Level	88.11	89.61	91.53	95.64	83.10	87.63	89.45	91.40	96.99	83.91
Level with 10 year certain	88.11	89.38	91.18	94.63	82.84	88.17	89.55	91.31	96.02	83.90
Indexed at 5% pa	81.25	83.37	87.05	94.63	76.29	82.21	84.58	87.96	97.89	78.62

Table 15: Money Worth Ratios for a range of last survivor annuity products

Age of purchase	**65 for male and 60 for female**								
Mortality table	ALT90-92	A95-97	A95-97 imp	0.6*IM80/ IF80	A95-97 imp	ALT90-92	A95-97	A95-97 imp	0.6*IM80/ IF80
Interest assumption	5.13%	5.13%	5.13%	5.13%	5.63%	spot rates			
Type of annuity	%	%	%	%	%	%	%	%	%
Level	90.78	92.09	94.27	98.40	89.61	82.34	93.67	95.89	100.08
Level with 10 year certain	89.21	90.43	92.53	96.48	87.96	90.75	91.99	94.12	98.13
Indexed at 5% pa	85.85	87.91	92.16	101.04	86.03	87.36	89.46	93.77	102.77

6 The impact of Government regulations

6.1 Taxation

The taxation of annuities in Australia has two components. These rules apply to both life and allocated annuities.

The first is that taxation of the investment income earned by the assets backing the annuities in payment. This investment income is exempt from any taxation. Whilst this may be considered 'normal' in most developed economies, it must be recognised that the investment income earned by superannuation and pension funds during the pre-retirement period in Australia is subject to a 15% tax. Hence the exemption from tax on the investment income from assets backing annuities is a deliberate taxation policy to encourage retirees to invest in post-retirement income products.

The second is that tax is imposed on the pension or annuity income received. The income is included in the individual's assessable income and taxed at marginal income tax rates. However, the following two adjustments apply:

1. The taxable income each year is reduced by an amount equal to the undeducted purchase price divided by the annuitant's life expectancy at the date of purchase. The undeducted purchase price is generally the member's contributions that have not received any taxation support. This measure is designed to avoid contributions from after-tax income being subject to taxation a second time.
2. A rebate equal to 15% of the taxable amount of the pension. This rebate is primarily designed to offset the 15% contributions tax on tax deductible contributions paid into the superannuation fund prior to retirement.

Hence, both these adjustments are designed to ensure some fairness in the tax system, given that some contributions are paid from after-tax income and other contributions are subject to a 15% contributions tax. As such, neither adjustment acts as a major incentive for individuals to purchase income products. However, as the undeducted purchase deduction is a flat reduction over the life of the annuity, it may act as an attractive feature for some annuity products (for example, indexed annuities where the annuity payment increases over time).

The above summary applies to annuities purchased directly from a superannuation benefit. It is also possible for a retiree to receive a lump sum superannuation benefit, pay the full lump sum taxation and then use the net amount to purchase a life annuity. In this case, the undeducted purchase price is the total purchase price (as full tax has been paid) but there is no 15% rebate.

6.2 The age pension means test

As indicated earlier, Australia has both an income and assets test in respect of eligibility to receive the publicly funded age pension. Both tests are used and the one that results in the lower pension is applied.

As most Australians receive their superannuation in lump sum form, the application of these tests is very important in influencing the decisions made by Australian retirees. It is therefore appropriate to briefly describe the income and assets tests as they apply to annuities.

The income test applies in the same way to both life and allocated annuities. The income used for the income test is defined as:

Gross income received minus a deductible amount,
where the deductible amount is total purchase price divided by the life expectancy at the date of purchase.

For example, if $100,000 is used to purchase a level life annuity for a male aged 65 with an annual payment of $8,405 (which is the average amount in Table 4), the amount of income that would be used in the income test equals:

$8,405 - 100,000/15.41 = \$1,916,$
where 15.41 is the life expectancy for a male aged 65.

In terms of the assets test, there is a major difference in the application of this test between the two types of annuities. Life annuities are exempt from the asset test, assuming that they meet certain conditions. These include that they cannot be commuted to a lump sum and are payable throughout the life of the annuitant. By contrast, the assets test is applied to the fund balance of an allocated annuity. The reason is that the individual has much more control over their income stream from an allocated annuity and furthermore, upon death, any remaining balance reverts to the person's estate.

Table 16 briefly outlines the different taxation and social security treatment of these two forms of annuities and, for comparison purposes, a bank deposit.

Table 16: Taxation and Social Security treatment of alternative investments

Product	Assessable income for income tax	Income test	Asset test
Life annuity	(Gross income Minus Deduction A[1]) Minus 15% rebate[3]	(Gross income Minus Deduction B[2])	Exempt
Allocated annuity	(Gross income Minus Deduction A[1]) Minus 15% rebate[3]	(Gross income Minus Deduction B[2])	Fund balance
Bank deposit	Gross income	Deemed income on balance at 3% and 4.5%	Balance

Notes

1 Deduction A is the member's undeducted contributions (i.e. those which have received no taxation deductions) divided by life expectancy, as at the date of purchase of the annuity.

2 Deduction B is the total purchase price divided by life expectancy, as at the date of purchase of the annuity.

3 The 15% rebate reduces the total tax paid.

The major influence on the investment decisions made by many Australian retirees is the effect of the income and assets test, and hence their eligibility to receive a part or full age pension. The definition of income under the income test for both forms of annuities can be considered to be generous and hence these products are attractive. It could be considered that the life annuities are even more attractive as the assets test does not apply. However, life annuities provide much less flexibility to the individual and have no bequest option. Furthermore, in the current low interest environment, many retirees and financial planners consider that the purchase of a life annuity means that you are locking in the current low interest rates for life.

Hence, for these reasons, allocated annuities are more popular. However, in some cases, individuals elect to invest in a combination of life and allocated annuities to preserve some flexibility whilst also ensuring that their total fund balance in the allocated product is beneath the relevant asset test limit.

These typical decisions by individual retirees indicate the lack of integration that exists between various sources of income within the Australian retirement income system. Many retirees are able to receive a full or part age pension from the Government after receiving a significant lump sum benefit from the tax supported superannuation system.

In essence, decisions are made to maximise the income received by individuals and their dependants in an environment where there is virtually no restriction on the use of the retirement benefit. The net result is that the Australian retirement income system is not operating efficaciously and the costs of future age pensions are not being reduced significantly following the introduction of a compulsory superannuation system in the private sector. As noted above, the attraction of annuity products is largely dependent on their treatment in the means tests.

7 Conclusion

The results in this paper concerning the Money's Worth of a life annuity do not determine whether a life annuity provides value to the purchaser. Rather, this will depend on the individual's circumstances, including their personal health and life expectancy, their attitude to risk, their personal discount rate, the application of the age pension means tests and their tax position.

However, it is interesting to note that the Money's Worth Ratios in the Australian life annuity market compare favourably with recent research from the UK and the US markets. For instance, Table 17 shows the Ratios for 65-year-old males and females in Australia, the US and the UK for both the population and annuitants mortality tables. In each case, the relevant Government bond yield curves have been used.

Table 17. An International Comparison

	Males aged 65			Females aged 65		
Table	Aust.	USA	UK	Aust.	USA	UK
Population	0.875	0.850	0.861	0.895	0.875	0.851
Annuitants	0.986	0.970	0.987	0.970	0.952	0.953

Sources: Poterba and Warshawsky (1999), Finkelstein and Poterba (1999)

Although comparisons between countries are difficult, the Australian Money's Worth Ratios shown in this paper suggest that, not withstanding the small market in life annuities, the value provided to the purchasers appears to be consistent with and, in many cases, slightly higher than provided in the US and UK markets.

Of course, such a result does not make life annuities attractive when other retirement income products are available. In particular, the flexibility of allocated annuities along with their tax and income test treatments (which is the same as that received by life annuities), means that allocated annuities are perceived to have considerable advantages for many investors, notwithstanding the extra risks accepted by the retiree.

Attachment A

Pension Valuation Factors

These factors determine the minimum and maximum payment limits for allocated pension and annuities.

Age of beneficiary	Maximum pension factor	Minimum pension factor
60	9.0	17.8
61	8.9	17.4
62	8.7	17.0
63	8.5	16.6
64	8.3	16.2
65	8.1	15.7
66	7.9	15.3
67	7.6	14.9
68	7.3	14.4
69	7.0	14.0
70	6.6	13.5
71	6.2	13.1
72	5.8	12.6
73	5.4	12.2
74	4.8	11.7
75	4.3	11.3
76	3.7	10.8
77	3.0	10.4
78	2.2	10.0
79	1.4	9.5
80	No maximum	9.1
81	No maximum	8.7
82	No maximum	8.3
83	No maximum	7.9
84	No maximum	7.5
85	No maximum	7.1
86	No maximum	6.8
87	No maximum	6.4
88	No maximum	6.1
89	No maximum	5.8
90	No maximum	5.5
Beyond 90	No maximum	and so on

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